Volunteer Lake Assessment Program Individual Lake Reports

MOUNTAINVIEW LAKE, SUNAPEE, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	832	**Max. Depth (m):**	6.7	**Flushing Rate (yr^{-1}):**	1
Surface Area (Ac.):	105	**Mean Depth (m):**	4.1	**P Retention Coef:**	0.69
Shore Length (m):	3,700	**Volume (m^3):**	1,758,000	**Elevation (ft):**	1116

TROPHIC CLASSIFICATION

Year	Trophic class
1978	OLIGOTROPHIC
1992	OLIGOTROPHIC

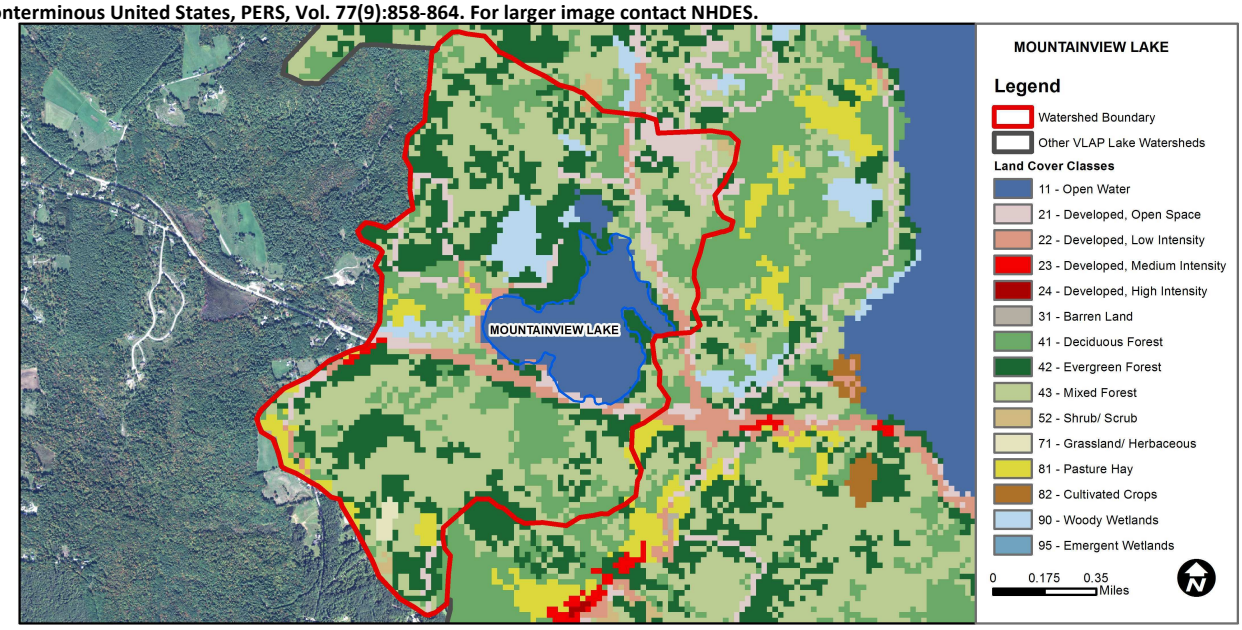
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Oxygen, Dissolved	Encouraging	Limited data for this parameter predicts water quality standards or thresholds are being met; however more data are necessary to fully assess the parameter.
	Dissolved oxygen satura	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	11.7	Barren Land	0.04	Grassland/Herbaceous	0.45
Developed-Open Space	6.05	Deciduous Forest	13.62	Pasture Hay	2.57
Developed-Low Intensity	3.09	Evergreen Forest	23.9	Cultivated Crops	0
Developed-Medium Intensity	0.21	Mixed Forest	34.41	Woody Wetlands	3.09
Developed-High Intensity	0	Shrub-Scrub	0.39	Emergent Wetlands	0

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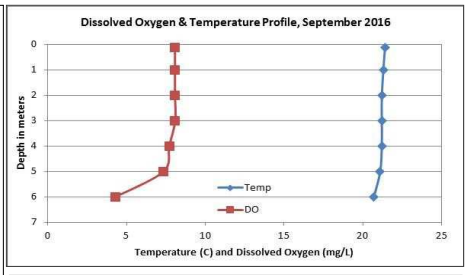
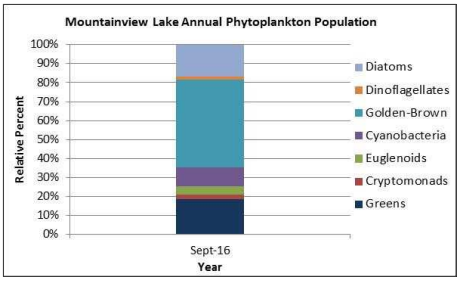
Mountainview Lake, Sunapee
2016 Data Summary

Recommended Actions: The increased frequency and intensity of storm events may be impacting lake clarity (transparency) by flushing tributary/wetland systems rich in dissolved organic matter that imparts a "tea" color to the water. Apparent color was measured in September to establish a baseline data set to track changes in water color. The September data suggest clear conditions however this was a drought year with little influence from tributary systems. It will be interesting to collect data during a wet year to measure difference in water color. Several tributaries sampled during 2016 following storm events indicated moderately colored water which likely affected turbidity and phosphorus levels. Low flow and stagnant conditions also were prevalent due to drought conditions but volunteers did a good job to only sample tributaries that were flowing. North Inlet phosphorus levels were greatly elevated in 2016 and this station has a history of fluctuating and elevated levels. Field and laboratory data suggest water with high color and organic content likely flowing from wetlands and/or beaver ponds suggesting natural influences in fluctuating phosphorus levels. The improving chlorophyll levels are a great sign and epilimnetic phosphorus levels have stabilized within a lower range since 2002; we hope to see this continue! Keep up the great work!

Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were slightly elevated in July, decreased to a low level in August, and then increased to a slightly elevate level in September. The 2016 average chlorophyll level increased from 2015 and was slightly less than the state median. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot, Mud Pd. Bk., N. Hamel Rd, and Outlet conductivity and/or chloride levels were slightly elevated and greater than the state medians. Historical trend analysis indicates highly variable epilimnetic (upper water layer) conductivity levels since monitoring began. Hamel Bk. and Hamel Bk. at 103 conductivity and chloride levels were greater than the remaining stations and indicative of road salt impacts. North Brook and Rt. 103 Inlet conductivity levels were within a low to average range.
- **Total Phosphorus:** Epilimnetic phosphorus levels fluctuated within a low to average range. Hypolimnetic (lower water layer) phosphorus levels decreased from July through September and were within an average range. Average epilimnetic phosphorus increased from 2015 and was slightly less than the state median. Historical trend analysis indicates stable epilimnetic phosphorus with high variability between years. Hamel Bk. at 103, Hamel Bk. and Rt. 103 Inlet phosphorus levels were elevated in August and September during and after significant storm events that occurred following drought conditions. North Brook phosphorus levels were greatly elevated in July and August and field and lab data note colored water, low flows and significant storm events prior to sampling. Mud Pd. Bk., N. Hamel Rd. and Outlet phosphorus levels were within a low to average range.
- **Transparency:** Transparency measured without the viewscope (NVS) was average in July, decreased (worsened) in August, and then increased (improved) in September. Average transparency increased (improved) slightly from 2015 and was slightly higher (better) than the state median. However historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.
- **Turbidity:** Epilimnetic turbidity was slightly elevated in August and Hypolimnetic turbidity was slightly elevated in July and August. Low water levels, algal growth and recent storm events could have affected turbidity. Hamel Bk. at 103, North Brook and Outlet turbidities were elevated in August and lab data note colored water and sediment in the Outlet. Hamel Brook turbidities were slightly elevated on each sampling event. Rt. 103 Inlet turbidity was elevated in September during the storm event.
- **pH:** Epilimnetic, Hypolimnetic, Hamel Bk., Hamel Bk. at 103, Mud Pd. Bk., Outlet, and Rt. 103 Inlet pH levels were within the desirable range 6.5-8.0 units, however epilimnetic pH has historically fluctuated below the desirable range. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH levels since monitoring began. North Brook pH levels were slightly acidic and less than desirable.





NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Station Name	Table 1. 2016 Average Water Quality Data for MOUNTAINVIEW LAKE-SUNAPEE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color PCU	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	8.5	4.00	33	15	141.7	10	3.50	3.82	1.02	7.17
Hypolimnion					144.5	12			1.37	6.73
Hamel Bk. at 103					356.5	36			3.13	7.10
Hamel Brook			50		272.3	29			3.04	7.04
Mud Pd. Brook					137.1	18			0.77	6.63
N. Hamel Rd. In Lake					142.0	10			0.93	7.50
North Brook					62.5	168			3.06	6.05
Outlet					143.6	9			0.80	6.89
Route 103 Inlet					37.4	41			4.59	6.82

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Improving	Data significantly decreasing.
pH (epilimnion)	Worsening	Data significantly decreasing.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.